

## Claims

- [1] An RF front-end transceiver comprising:  
an oscillator for outputting a resonant frequency signal whose frequency is controlled by a frequency control signal;  
a receive amplifier for amplifying and outputting a receive RF signal;  
a receive mixer for mixing the receive RF signal amplified and the resonant frequency signal to convert the receive RF signal into a receive base band signal;  
a transmit mixer for mixing a transmit base band signal and the resonant frequency signal to convert the transmit base band signal into a transmit RF signal; and  
a transmit amplifier for amplifying and outputting the transmit RF signal,  
wherein a resonant frequency of at least one of the receive amplifier, the receive mixer, the transmit mixer and the transmit amplifier is controlled by the frequency control signal.
- [2] The RF front-end transceiver according to claim 1, wherein the frequency control signal is provided from a frequency synthesizer or a base band processor.
- [3] An RF front-end receiver comprising:  
an oscillator for outputting a resonant frequency signal whose frequency is controlled by a frequency control signal;  
a receive amplifier for amplifying and outputting a receive RF signal; and  
a receive mixer for mixing the receive RF signal amplified and the resonant frequency signal to convert the receive RF signal into a receive base band signal,  
wherein a resonant frequency of at least one of the receive amplifier and the receive mixer is controlled by the frequency control signal.
- [4] The RF front-end receiver according to claim 3, wherein the frequency control signal is provided from a frequency synthesizer or a base band processor.
- [5] The RF front-end receiver according to claim 3, wherein the frequency control signal includes an analog frequency control signal and a digital frequency control signal.
- [6] The RF front-end receiver according to claim 3, wherein the frequency of the resonant frequency signal is controlled by an analog frequency control signal and a digital frequency control signal, and  
wherein, a resonant frequency of the receive amplifier and the receive mixer is controlled by the frequency control signal or only the digital frequency control

signal.

- [7] The RF front-end receiver according to claim 6, wherein the receive amplifier has a net input resistance controlled by the digital frequency control signal.
- [8] An RF front-end transmitter comprising:
  - an oscillator for outputting a resonant frequency signal whose frequency is controlled by a frequency control signal;
  - a transmit mixer for mixing a transmit base band signal and the resonant frequency signal to convert the transmit base band signal into a transmit RF signal; and
  - a transmit amplifier for amplifying and outputting the transmit RF signal, wherein a resonant frequency of at least one of the transmit mixer and the transmit amplifier is controlled by the frequency control signal.
- [9] The RF front-end transmitter according to claim 8, wherein the frequency control signal is provided from a frequency synthesizer or a base band processor.
- [10] The RF front-end transmitter according to claim 8, wherein the frequency control signal includes an analog frequency control signal and a digital frequency control signal.
- [11] The RF front-end transmitter according to claim 8,
  - wherein the frequency of the resonant frequency signal is controlled by an analog frequency control signal and a digital frequency control signal, and
  - wherein, a resonant frequency of the transmit amplifier and the transmit mixer is controlled by the frequency control signal or only the digital frequency control signal.
- [12] The RF front-end transmitter according to claim 11, wherein the transmit amplifier has a net input resistance controlled by the digital frequency control signal.
- [13] An amplifier comprising:
  - an amplification unit for amplifying a signal inputted to an input unit and outputting the amplified signal to an output unit; and
  - an input resonant unit connected to the input unit, and for changing a resonant frequency in accordance with a frequency control signal,
  - wherein the frequency control signal is used to control a frequency of a resonant frequency signal outputted from an oscillator.
- [14] The amplifier according to claim 13, further comprising:
  - an output resonant unit connected to the output unit, and for changing the

- resonant frequency in accordance with the frequency control signal.
- [15] The amplifier according to claim 13, wherein the frequency control signal includes an analog frequency control signal and a digital frequency control signal.
- [16] The amplifier according to claim 13, wherein the resonant unit is any one of a first LC tank including a inductor controlled by the digital frequency control signal and a capacitor controlled by the analog frequency control signal; a second LC tank including a capacitor controlled by the digital frequency control signal, a capacitor controlled by the analog frequency control signal and a fixed capacitor; a third LC tank including an inductor and a capacitor controlled by the digital frequency control signal, and a capacitor controlled by the analog frequency control signal and a fixed inductor; and a fourth LC tank including an inductor controlled by the digital frequency control signal, an inductor controlled by the analog frequency control signal and a fixed capacitor.
- [17] The amplifier according to claim 13, wherein the frequency control signal includes a digital frequency control signal.
- [18] The amplifier according to claim 13, further comprising:  
a net resistance control unit connected to the input unit, and for changing the net input resistance in accordance with the frequency control signal.